

Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Fox River

Waterbody Segment at a Glance:

County: Clark
Nearby Cities: Wayland
Length of impairment: 12 miles
Pollutant: Manganese
Source: Natural



State map showing location of watershed

TMDL Priority Ranking: Low

Description of the Problem

Beneficial uses of Fox River

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health associated with Fish Consumption
- Boating and Canoeing
- Drinking Water Supply

Use that is impaired

- Drinking Water Supply

Standards that apply

Missouri Water Quality Standards in 10 CSR 20-7.031 Table A allows 50 µg/L as the maximum amount of manganese allowed for Drinking Water Supply source waters. The recommended limit of manganese in treated drinking water is also 50µ/L. Exceedence of this standard is not a threat to human health or aquatic life in general.

Background Information and Water Quality Data

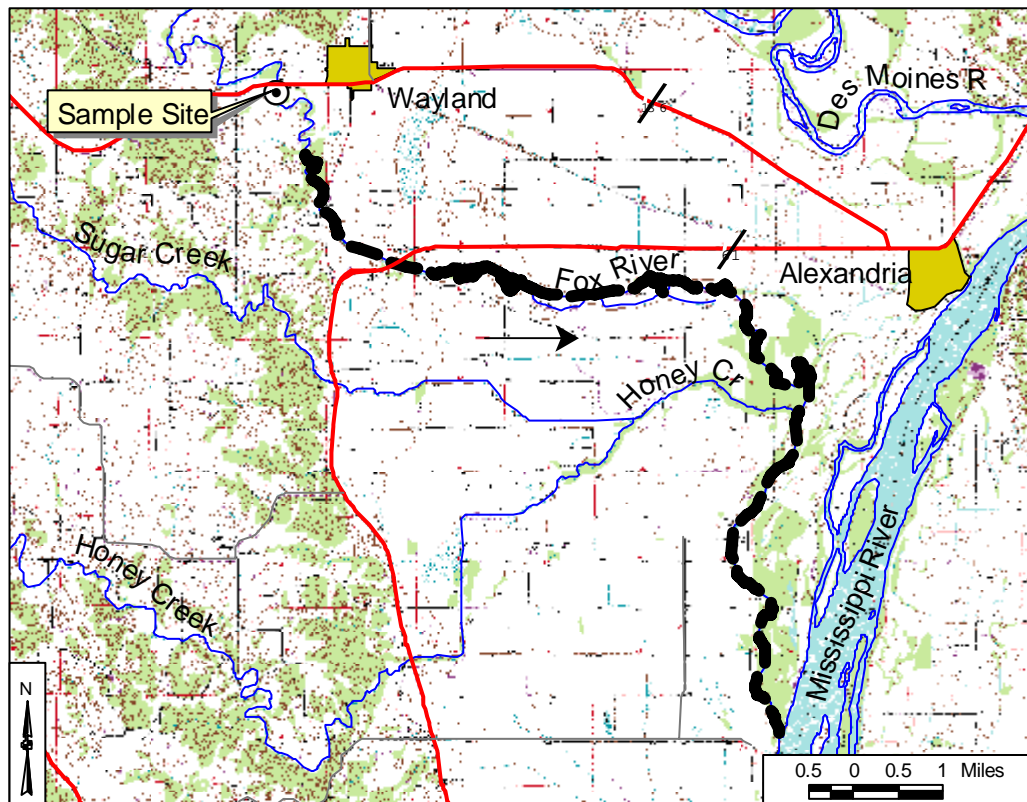
Monitoring of the Fox River near Wayland, Missouri by the U.S. Geologic Survey (USGS) and MO Department of Natural Resources (MDNR) since 1999 has shown an average level of dissolved manganese of 170 µg/L (micrograms per Liter or parts per billion). There are no known man-made sources of manganese in this watershed. The source of the manganese is natural manganese in the groundwater base flow to the stream. Other streams in Northeastern Missouri also have elevated levels of dissolved manganese. Groundwater dissolves constituents in the soils and bedrock as it percolates down to aquifers that eventually feed into streams, springs and wetlands. The Missouri

Northeastern Groundwater Province has very high levels of dissolved minerals in groundwater. Much of the groundwater above the Freshwater-Saline Water Transition Zone, which bisects the state, is so highly mineralized that it can not be utilized as a drinking water source. This water contributes high levels of minerals to surface water including manganese.

Manganese does not present any human health hazards, but can be responsible for offensive taste and appearance in drinking water, if it is present. However, drinking water supplies can remove manganese if necessary in the finished water sold to customers. The Missouri Clean Water Commission voted to remove manganese and iron from the list of impairments to drinking water sources since they do not cause health problem, do not adversely effect aquatic life, and can be removed by drinking water treatment facilities. That action will take effect December 31, 2005.

A map of the impaired segment and sample site as well as a table of the water quality data follows.

Impaired Segment of Fox River in Clark County, Missouri, Showing Location of Sampling Site



--- Impaired Segment → Direction of Flow

Water chemistry data (ug/L)					Iron	Manganese	Flow
Org	Site Name	Yr	Mo	Dy	Mg/L	Mg/L	cfs
USGS	Fox R. nr. Wayland,MO.	1999	11	23	67	220	
USGS	Fox R. nr. Wayland,MO.	1999	11	23	70	224	7.3
MDNR	Fox R. nr. Wayland,MO.	2000	3	21	22.9	277	
USGS	Fox R. nr. Wayland,MO.	2000	5	23	24	310	6.9
USGS	Fox R. nr. Wayland,MO.	2000	5	23	20	311	
MDNR	Fox R. nr. Wayland,MO.	2000	5	25	9.4	274	
MDNR	Fox R. nr. Wayland,MO.	2000	8	31	4.499	164	
USGS	Fox R. nr. Wayland,MO.	2000	11	27	100	218	12
MDNR	Fox R. nr. Wayland,MO.	2000	11	28	10.7	216	
MDNR	Fox R. nr. Wayland,MO.	2001	3	8	231	272	
USGS	Fox R. nr. Wayland,MO.	2001	5	16	760	26	1180
MDNR	Fox R. nr. Wayland,MO.	2001	6	22	104	1.4	
MDNR	Fox R. nr. Wayland,MO.	2001	9	10	37.7	33.9	
MDNR	Fox R. nr. Wayland,MO.	2001	9	24	134	5.68	
USGS	Fox R. nr. Wayland,MO.	2001	11	13	87	256	23
MDNR	Fox R. nr. Wayland,MO.	2002	2	6	11.7	281	
USGS	Fox R. nr. Wayland,MO.	2002	5	14	520	33.4	2020
MDNR	Fox R. nr. Wayland,MO.	2002	6	13	271	4.59	
USGS	Fox R. nr. Wayland,MO.	2002	11	4	27	233	7.8
USGS	Fox R. nr. Wayland,MO.	2003	5	20	7	42.5	
Mean					125.9	170.1735	
Water Quality Standard *					300	50	

For more information call or write:

Missouri Department of Natural Resources

Water Pollution Control Program

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